Andean Larvae and Chrysalids of *Dione juno andicola* (Bates) and *Agraulis vanillae lucina* Felder & Felder

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Abstract: The mature larva and pupa of *Dione juno andicola* Bates are described from Baños, Ecuador, and compared with those of other subspecies of *juno*. The differences are sufficient to cast doubt upon the assignment of *andicola* to the species *juno*. The egg and five larval stages of *Agraulis vanillae lucina* Felder & Felder are described from Baños, Ecuador. Although the imago of *lucina* is quite different from those of other subspecies of *vanillae*, the larval stages support assignment of *lucina* to *vanillae*.

INTRODUCTION

While I was going through old papers trying to make manageable the accumulations from three offices I found the following notes of observations made in 1938 in Ecuador. I sent them at that time to the late Dr. John A. Comstock and do not recall that he ever published them. At this time I have added to the original manuscript comparisons with the mature larvae and pupae of the species as observed in other areas.

Dione juno andicola Bates

Two full-grown larvae of this Andean taxon were collected October 9, 1938, on the trail from Baños, Tungurahua, Ecuador, to Runtun—a high hill just south of the town. They were making silk patches on the heavy leaves of maguey, which obviously is not their food plant. One specimen was preserved in alcohol (and dispatched to Comstock) and the other allowed to pupate and emerge for determination.

Mature larvae. Length 3.0 cm., greatest diameter 4.5 mm. The ground color is dark olive brown, almost black. This is almost obliterated by a mosaic of dark burnt-orange spots. The anal plate and head are black. Segment T1 bears two short subdorsal scoli, T2 has two long lateral scoli and T3 two long subdorsal and two short lateral scoli. Each abdominal segment except the last bears six short scoli. These are arranged in subdorsal, lateral, and sublateral rows. The lateral pair is missing on the last segment. All of the scoli and the spines that adorn them are black.

Beebe, Crane, and Fleming (1960, text Fig. 5A) show a caterpillar of *Dione juno juno* (Cramer) from Trinidad, and Muyshondt, Young, and Muyshondt (1973, Fig. 2A) show *D. juno huascama* Reakirt caterpillars from Salvador with the scoli on the thorax not prominently different in length from those on the abdominal segments. This suggests to me that *andicola* may not be a subspecies of *juno* but a valid, albeit cryptic, species. Trinidadian *juno* (Beebe, Crane, and Fleming, 1960, p. 129) is described as "body velvety dark brown to almost black with small, paired spots, brownish-yellow to brown-orange. On middle part of body the arrangement is very regular, in three series. . . . Thus structurally and in coloring *andicola* differs from *juno juno* in the fifth instar.

Salvadorian *huascama* is colored more like *andicola*. Muyshondt et al. (1973, p. 141) states: "In the fifth instar the coloration is distinctive, being a mottled light brown." This is in accord with *andicola* so far as coloring is concerned. The scoli on *huascama* are like those on *juno juno*.

Pupa. Length 2.23 cm., greatest depth 0.89 cm., greatest width (at wing flanges) 0.67 cm. Highly cryptic, marbled black and cream with the black predominant. It hangs pendant from a tuft of silk. It is strongly keeled with a deep thoracic arch in the dorsum. All the organs of the head are studded with dull red-brown warts. The inner margins of the forewings form thick, dirty white flanges on the sides. The outer margins of the wings are decorated with fine black lines forming "Ts" at the ends of the nervules. The first three abdominal segments are decorated with subdorsal warty ridges and a wart above the black stigma. The ventrum of these segments is covered by the wing cases. Segments 4–6 bear large, subdorsal, warty prominences at their caudal margins and, centrally, at the anterior margin, have smaller, deep cream-colored warts. Segment 7 bears a subdorsal pair of small, red-brown warts. Segment 8 and the cremaster are covered with small red-brown warts. On the sides of segments 4–7 the creamy white marbling dominates the coloring. The ventrum of segments 4–6 is a creamy pink that is reminiscent of a patch of mold.

The specimen pupated during the night of October 11 and emerged at 10:30 A.M. on October 25.

Beebe et al. (1960, pl. XIV, Fig. 82) and Muyshondt et al. (1973, Fig. 2B) suggest that the shapes of the pupae of *juno*, *huascama*, and *andicola* are essentially the same. This probably is a generic feature. Both *juno juno* and *huascama* are described as brown or dark brown in color. Thus *andicola*'s strongly mottled coloring is quite different.

Until proven wrong I will consider *andicola* Bates to be a full species in the genus *Dione*.

Agraulis vanillae lucina Felder & Felder

This seems to be the most common representative of the family in Baños during October. The imagoes vary considerably, some of them being very dark on the underside, others much lighter and in that respect like *Agraulis vanillae*. For a while I wondered if this was *moneta* (Huebner). The larvae, however, are markedly different from those of *Dione*. Michener (1942) found what have been accepted to be valid generic differences between *moneta* and *vanillae*. As he pointed out, *lucina* is quite unlike *vanillae* in markings and some might hold it a different species. *Oviposition*: The only females observed ovipositing were very much battered. Oviposition took place only in bright sunshine. The eggs were laid singly on various parts of a *Passiflora* vine (species not determined). Some were on the leaves, some on the stem, others on the tendrils and buds. One female was observed on the first sunny afternoon after almost a week of rain and dull weather. During a half-hour period she laid twenty-three eggs on the upper side of a leaf near its tip. This is the only time such an occurrence was observed. Unfortunately for me and posterity, a pet parrot discovered the batch of eggs before I tried to collect them! *Egg*: Subconical, lemon-yellow in color, 0.9 mm. high and 0.4 mm. in greater diameter. The sides are sculptured with 14 ridges. Between these ridges the surfaces are pitted with elliptic depressions.

These eggs were somewhat smaller than those of *vanillae vanillae* (Linnaeus) (Beebe et al., 1960, p. 117) and with several fewer vertical ridges. The number of ridges and the coloring probably have little taxonomic value at species level since, within the Heliconiidae, species are known with highly variable eggs.

First instar. The larva at eclosion is 2.2 mm. long with a head capsule about 0.3 mm. across. It grew to between 4 and 5 mm. before making its first moult. The head is black

with scattered long, black spines. The body is dirty olive gray with a little white mottling. T1 bears 16 black spines of which 10 terminate in little knobs. Such knobbed spines (or setae) are highly diagnostic for *Agraulis*. T2 and T3 each bear 14 spines of which 8 are knobbed. Each of the abdominal segments bears 10 knobbed spines. The anal plate bears 4. The 6 dorsal spines of T1 are set in a black patch.

Second instar. The larvae at this stage are about 7 mm. long and the head capsule is 0.6 mm. across. In general the insect appears as in the first instar with increased white mottling and each of the spines set in a small, subconical, brown papule, except the dorsal spines of T1 in the black patch.

Third instar. The larvae of this stage are about 15 mm. long and the head capsule 1.1 mm. wide. The ground color is purple brown. There are broad dorsal and lateral stripes of yellow which are finely set with black hairs. Each segment bears three pairs of black scoli. The head, legs, and anal appendages are black. The head bears in addition to short black spines two rather large coronal scoli. As the time for the third moult approaches, the yellow dorsal stripe breaks up in each segment into a "T" with 5 dots, 3 over the crossbar and one on each side of the stem.

Fourth instar. During this stage the larvae attain 25 mm. length and the head capsule is 2.0 mm. wide. The markings and decoration are as in the third instar with one great exception: The dorsal stripe is divided into three parallel stripes broken at the septa.

Fifth instar. The largest specimens of this instar measured 51 mm. long but the average was about 45 mm. The head capsules were close to 3.5 mm. wide. The ground color is nearly puce. The dorsal stripe is dull orange yellow to canary yellow and patterned as in the 4th instar. The lateral stripes are creamy white to pale canary yellow. These are occasionally tinged with purple toward the close of the instar. The dorsal stripes are sometimes edged with gray-white. The coronal scoli are prominent.

Pupa. Length 23 mm., greatest depth 9.6 mm., greatest width 6.4 mm. The pupa is suspended from a pad of silk. The shape of the pupa is not much different from typical *vanillae* as described by Beebe et al. (1960, p. 147, Figs. 71, 72). Compared with *juno*, the pupa of *lucina* has the keel and laterally compressed thoracic process but much more prominent. The color is dull rust brown with a few streaks of darker brown on the wing cases. The entire surface is finely rugous. The abdominal processes are not as bold as those on *juno* nor are they as warty.

There appears to be very liitle difference between the larvae of *vanillae vanillae* from Trinidad noted by Beebe et al., and those of the "un*vanillae*"-looking subspecies *lucina*. The longitudinal stripes on *lucina* appear to be broader and more continuous. The knobbed hairs of the 1st-instar larvae are highly characteristic of *vanillae*. D'Almeida's (1922, p. 126) description of the larvae of the Brazilian subspecies *maculosa* (Stichel) differs only in minor points of coloration from the Andean subspecies.

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